Chosen Valley Testing, Inc.

Geotechnical Engineering and Testing • 31 1st Ave. South, Rice, MN 56367 • Telephone (320) 393-3306• Fax (320) 393-3309

Mr. Bob Miller
KLD
1120 Industrial Park Road SW
Brainerd, MN 56401

April 17, 2007

Re: Design Phase Geotechnical Services
Proposed Industrial Park
Thiesse Drive
Brainerd, Minnesota
CVT Project Number: S2007.051

Dear Mr. Miller:

We have completed the drilling and geotechnical evaluation for the proposed industrial park in Brainerd, Minnesota. This brief letter summarizes the findings in the attached report.

Summary of Findings

The majority of the borings encountered about ½ to 1 foot of topsoil at the surface. The soils below the topsoil were dominated by silty sands (glacial till). The glacial till was typically very dense and often contained cobbles. In many of the borings, a looser layer of sand with silt and/or silty to clayey sand was present in the upper 4 to 9 feet of the borings.

A few layers of sand were observed within the silty sand glacial till. The sand layer was met between about elevation 1225 and 1230 feet in three of the borings.

Aside from two borings which terminated in the sand, all of the borings were terminated in silty sand glacial till at about 16 feet. Three of the borings met hollow-stem auger refusal above their planned depths, presumably on cobbles or boulders. Two 15-foot borings met refusal at depths of 11 and 7 feet. The boring which was to be drilled to 40 feet met refusal at about 33 feet.

None of the borings encountered free water or water bearing soils. The uppermost sand with silt and silty/clayey sand often contained more moisture than the very dense glacial till at depth. This moisture appears to be perched above the very dense soils and may be due to thawing conditions at the time of drilling. Based on the combined findings it appears that the groundwater level is below the depths explored.

Summary of Analysis and Recommendations

Rough Grading: During rough grading, we recommend stripping the topsoil from beneath the building, roadway and oversize areas. These materials were about ½ to 1 foot deep at the locations explored. In paved areas where more than 3 feet of fill is needed to reach the subgrade elevation, it should be adequate to simply strip the root zone (about ½ foot).

We expect that the on-site materials would be used as fill. These soils are expected to be generally granular soils, ranging from slightly silty sands (sand with silt) to silty to clayey sands. These soils are considered to be suitable for use as fill, provided they are adequately compacted.

Utilities: The soils encountered are expected to provide adequate support for utilities. Cobbles and

boulders should be expected and should be kept away from the pipes.

Pavements: After stripping and grading, the subgrade is expected to range from sand with silt to silty to clayey sands. We recommend that the subgrade soils are thoroughly blended to even out any discontinuities in the subgrade. The dominant silty to clayey sands are expected to have R-values on the order of 30 to 60. We recommend using a value of 30 for design.

Remarks

We appreciate the chance to provide our professional services to you. The attached report provides more details of our recommendations for the proposed project. If you have any questions about our report, please call us at (507) 281-0968.

Sincerely,
Chosen Valley Testing, Inc.

Jay Nopola, PE
Geological Engineer

Colby T. Verdegan, PE
Geotechnical and Materials Engineer

Design Phase Geotechnical Services
Proposed Industrial Park
Thiesse Drive
Brainerd, Minnesota
CVT Project Number: S2007.051
Date: April 17, 2007

A. Introduction

The intent of this report is to present our results to the client in the same logical sequence that led us to arrive at the opinions and recommendations expressed. Since our services must often be completed before the design, assumptions are sometimes needed to prepare a proper evaluation and to analyze the data. A complete and thorough review of this entire document, including the assumptions and the appendices, should be undertaken immediately upon receipt.

A.1. Purpose

This report was prepared to assist planning for the proposed industrial park in Brainerd, Minnesota. Our services were authorized by Mr. Bob Miller of KLD.

A.2. Scope

To obtain data for analysis, we were authorized to perform a total of 16 penetration test borings at the site. The borings were drilled to depths of about 15 feet, with one of the borings extended to 40 feet. The 40-foot boring and two of the 15-foot borings met refusal above their planned depths, apparently on cobbles or boulders.

A.3. Boring Locations and Elevation

The desired borings locations were indicated on a survey map provided by KLD. The approximate locations of the borings as drilled are shown on the Boring Location Sketch in the Appendix. Elevations for all borings except B-1 and B-12 were provided by KLD. Ground surface elevations at Borings B-1 and B-12 were estimated to the nearest foot based on a survey map of the site. These elevations should be considered approximate.

A.4. Geologic Background

A geotechnical report is based on subsurface data collected for the specific structure or problem. Available geologic data from the region can help interpretation of the data and is briefly summarized in this section.

Geologic maps suggest that the natural soils in the area are of drumlinized, sandy glacial till which is often overlain by a few feet of fluvial or eolian sands. Organic deposits are expected in the wetland deposits to the north. Bedrock was expected to be on the order of 150 to 200 feet below the surface. The uppermost bedrock is likely metasedimentary rocks.

B. Subsurface Data

Methods: All of the borings were performed using penetration test procedures (Method of Test D1586 of the American Society for Testing and Materials). This procedure allows for the extraction of intact soil specimen from deep in the ground. With this method, a hollow-stem auger is drilled to the desired sampling depth. A 2-inch OD sampling tube is then screwed onto the end of a sampling rod, inserted through the hole in the auger's tip, and then driven into the soil with a 140-pound hammer dropped repeatedly from a height of 30 inches above the sampling rod. The sampler is driven 18-inches into the soil, unless the material is too hard. The samples are generally taken at 2½- to 5- foot intervals. The core of soil obtained is classified and logged by the driller and a representative portion is then sealed in a jar and delivered to the soils engineer for review.

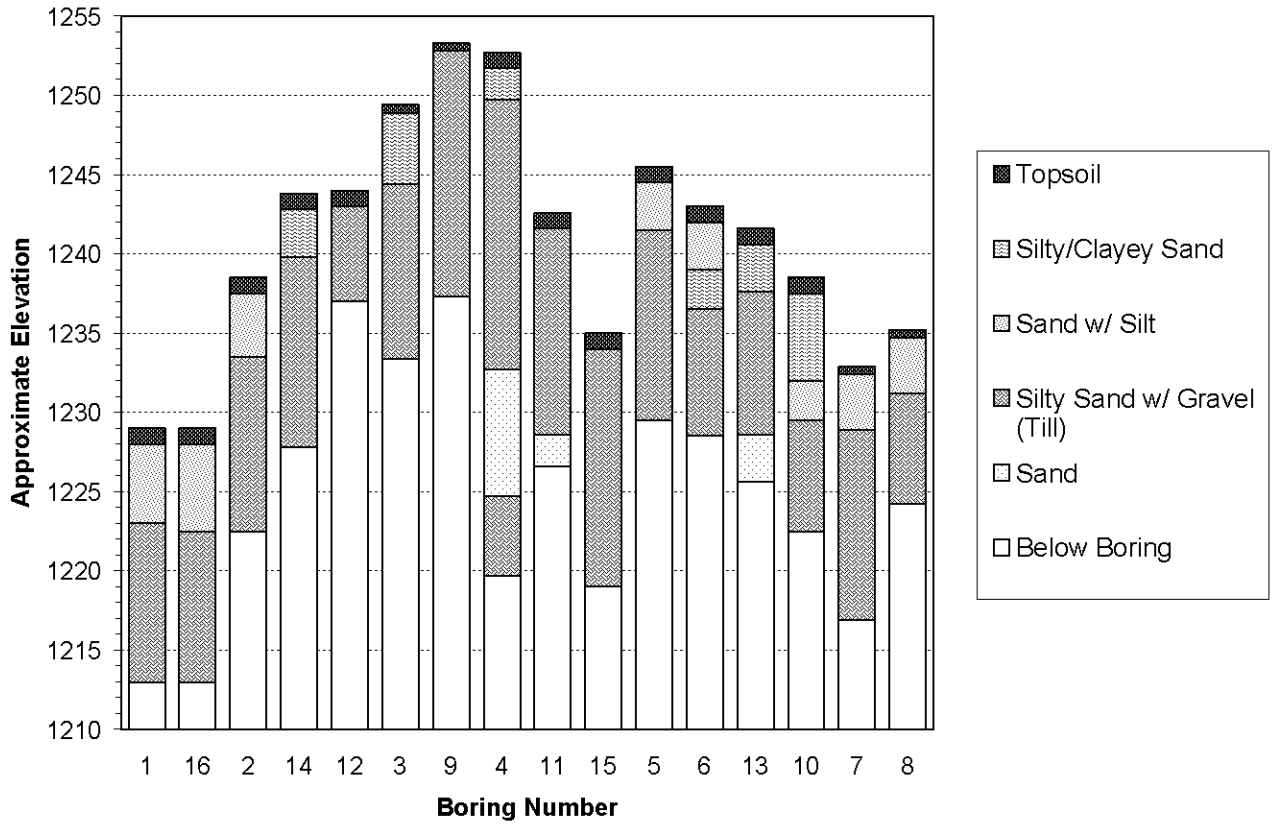
B.1. Strata

The majority of the borings encountered about ½ to 1 foot of topsoil at the surface. The soils below the topsoil were dominated by silty sand (glacial till). The glacial till was typically very dense and often contained cobbles. In many of the borings, a looser layer of sand with silt and/or silty to clayey sand was present in the upper 4 to 9 feet of the borings.

A few layers of sand were observed within the silty sand. The sand layer was met between about elevation 1225 and 1230 feet in Borings B-4, B-11 and B-13.

Aside from Borings B-11 and B-13, which terminated in the sand, all of the borings were terminated in silty sand glacial till at about 16 feet. Three of the borings met hollow-stem auger refusal above their planned depths, presumably on cobbles or boulders. Borings B-8 and B-12 met refusal at depths of 11 and 7 feet, respectively. Boring B-4, which was to be drilled to 40 feet, met refusal at about 33 feet.

For the reader's convenience, a generalized cross section of the borings is provided below. The borings are displayed in a generally west to east orientation for ease of interpretation. For more detailed information, the reader is referred to the boring logs in the Appendix.



B.2. Penetration Test Results

The number of blows needed for the hammer to advance the penetration test sampler is an indicator of soil characteristics. The number of blows to advance the sampler 1 foot is called the penetration resistance or "N"-value. The results tend to be more meaningful for natural mineral soils, than for fill soils. In fill soils, compaction tests are more meaningful.

The upper sand with silt and silty/clayey sands returned resistance values from 4 to 51 BPF, indicating they were variable and ranged from very loose to very dense, but were most often medium dense to dense. The

glacial till silty sand returned values from 24 BPF to 50 blows for 1 inch of advancement, indicating these soils ranged from medium dense to very dense, but were typically dense to very dense. The very high resistance values are likely where cobbles were encountered. Values from 18 to 62 BPF were recorded in the sand layers, indicating they ranged from medium dense to very dense.

B.3. Groundwater Data

During the drilling operation, the drillers may note the presence of moisture on the sampling instrument, in the cuttings, or within the boreholes. These observations are recorded on the boring logs. The water level may vary with weather; time of year and other factors and the presence or absence of water during the drilling is subject to interpretation and is not always conclusive.

None of the borings encountered free water or water bearing soils in the borings. The uppermost sand with silt and silty/clayey sand often contained more moisture than the very dense glacial till at depth. This moisture appears to be perched above the very dense soils and may be due to thawing conditions at the time of drilling. Based on the combined findings it appears that the groundwater level is below the depths explored.

C. Project Design Data

Each structure has a different loading configuration and intensity, different grades, and different structural and performance tolerances. Therefore, the geotechnical exploration will be construed differently from one structure to another. If the initial structure should change design, we should be engaged to review these conditions with respect to the prevailing soil conditions. Without the opportunity to review any such changes, the recommendations may no longer be valid or appropriate.

The proposed project consists of grading for industrial development and installing streets and utilities. We have not seen a grading plan for the site. Based on the 20 feet of relief at the site, we expect that cutting and filling may be on the order of 10 feet in some areas. Utilities are expected to bear at depths of about 5 to 12 feet below final grades and roads are expected to support typical industrial traffic.

D. Analysis

D.1. Rough Grading

During rough grading, we recommend stripping the topsoil from beneath the building, roadway and oversize areas. These materials were about ½ to 1 foot deep at the locations explored. In paved areas where more than 3 feet of fill is needed to reach the subgrade elevation, it should be adequate to simply strip the root zone (about ½ foot).

We expect that the on-site materials would be used as fill. These soils are expected to be generally granular soils, ranging from slightly silty sands (sand with silt) to silty to clayey sands. These soils are considered to be suitable for use as fill, provided they are adequately compacted.

D.2. Utilities

The soils encountered are expected to provide adequate support for utilities. Cobbles and boulders should be expected and should be kept away from the pipes.

D.3. Pavements

After stripping and grading, the subgrade is expected to range from sand with silt to silty to clayey sands. We recommend that the subgrade soils are thoroughly blended to even out any discontinuities in the

subgrade. The dominant silty to clayey sands are expected to have R-values on the order of 30 to 60. We recommend using a value of 30 for design.

The remainder of this report provides more details of our recommendations.

E. Rough Grading Recommendations

E.1. Stripping

We recommend removing all topsoil from the building, paved and oversize areas. These materials were about ½ to1 foot deep at the locations explored. In paved areas where more than 3 feet of fill is needed to reach the subgrade elevation, it should be adequate to simply strip the root zone (about ½ foot).

E.2. Over-Sizing

The stripped surface should be oversized at least 1 foot beyond the buildings for each foot of fill needed below footing grade. This over-sizing can be reduced by up to 50% if rather precise staking is present during grading. In that event, we suggest allowing a few extra feet as a nominal safety factor against stakes getting moved or against repositioning of the buildings on the site.

E.3. Filling and Compaction

The natural soils below the topsoil are considered to be suitable for general filling, provided they can be adequately compacted. The hill in the southeast of the site that will be cut is composed primarily of silty sand. All fill placed in building areas should be compacted to a minimum of 95 percent of its maximum standard Proctor density.

F. Utilities

F.1. Dewatering

Groundwater was not encountered in the borings. If any moisture is able to pond in trenches, a sump pump is expected to be capable of removing the moisture.

F.2. Trench Sidewalls

The contractor will be required to slope or shore the excavations as needed to meet OSHA requirements for safety. The silty sands that dominate the site are considered to be borderline Type B to Type C soils as defined by OSHA.

F.3. Trench Bottom Stability

The soils encountered are expected to provide adequate support for utilities. Cobbles and boulders should be expected and should be kept away from the pipes.

F.4. Fill Placement and Compaction

Soils placed as backfill should ideally be compacted to at least 95% of their standard Proctor density (ASTM D 698) and compacted to 100% of standard Proctor density in the upper 3 feet of paved areas. Backfill materials containing cobbles and boulders should be kept at least 1 foot away from pipes, lest they cause point loads on the pipes.

G. Paved Areas

G.1. Stripping and Grading

The soils after stripping and grading are expected to consist of materials ranging from sand with silt to silty to clayey sands. To provide more uniform support to the pavement, the subgrade soils should be graded as needed to even out any localized discontinuities in the subgrade soils. This will also help to limit differential frost heave. Presumably, the utility construction will accomplish this across most of the width of the roadway. Any areas not thoroughly mixed or treated by that process should be deeply scarified and then compacted to at least 95% of the soils maximum standard Proctor density. Fill in the upper 3 feet of roads should be compacted to at least 100% of the soils maximum standard Proctor density. The completed subgrade should be expected to pass a test roll.

G.2. Pavement Design

The R-values for the subgrade will vary depending on the materials present. The dominant silty to clayey sands are expected to have R-values on the order of 30 to 60, while the cleaner sands could have R values of up to 80. We recommend using an assumed R-value of no more than 30 for pavement design. In the absence of specific traffic loading data, we suggest a pavement section consisting of at least 4 inches of bituminous over 10 inches of aggregate base.

H. Construction Testing and Documentation

H.1. Excavation

The stripping operations can likely be accomplished with tracked equipment or scrapers if conditions are dry. If saturated soils exist at the surface, and for any deep excavations, a backhoe is recommended.

We expect that a large backhoe with a toothed bucket will be capable of removing any of the gravel and cobble-rich glacial till that dominated the site.

H.2. Compaction

All fill should be placed in lifts adjusted to the compactor being used and the material being compacted. We recommend limiting lifts to no more than 2 feet for clean sands or gravels and no more than 1 foot for materials containing silt or clay – assuming large, self-propelled or tow-behind compactors are used.

If the earthwork occurs during freezing temperatures, good winter construction practices should be used. No frozen fill should be used nor should structural filling take place on frozen ground.

H.3. Construction Phase Testing and Documentation

Ideally, the subgrade will be evaluated and documented by qualified personnel. Samples of any fill materials and/or alternative gradations of materials proposed for use should be submitted for approval before use. The owner may wish to have or may be obligated to have tests performed regarding the other various paving components. Although our firm offers testing services (such as compaction testing, stripping observations, pavement testing services, etc.), specification of such services is beyond our work scope and the designer should be consulted as to such requirements.

I. Level of Care

The opinions summarized in this report have been generated in accordance with the standard level of care

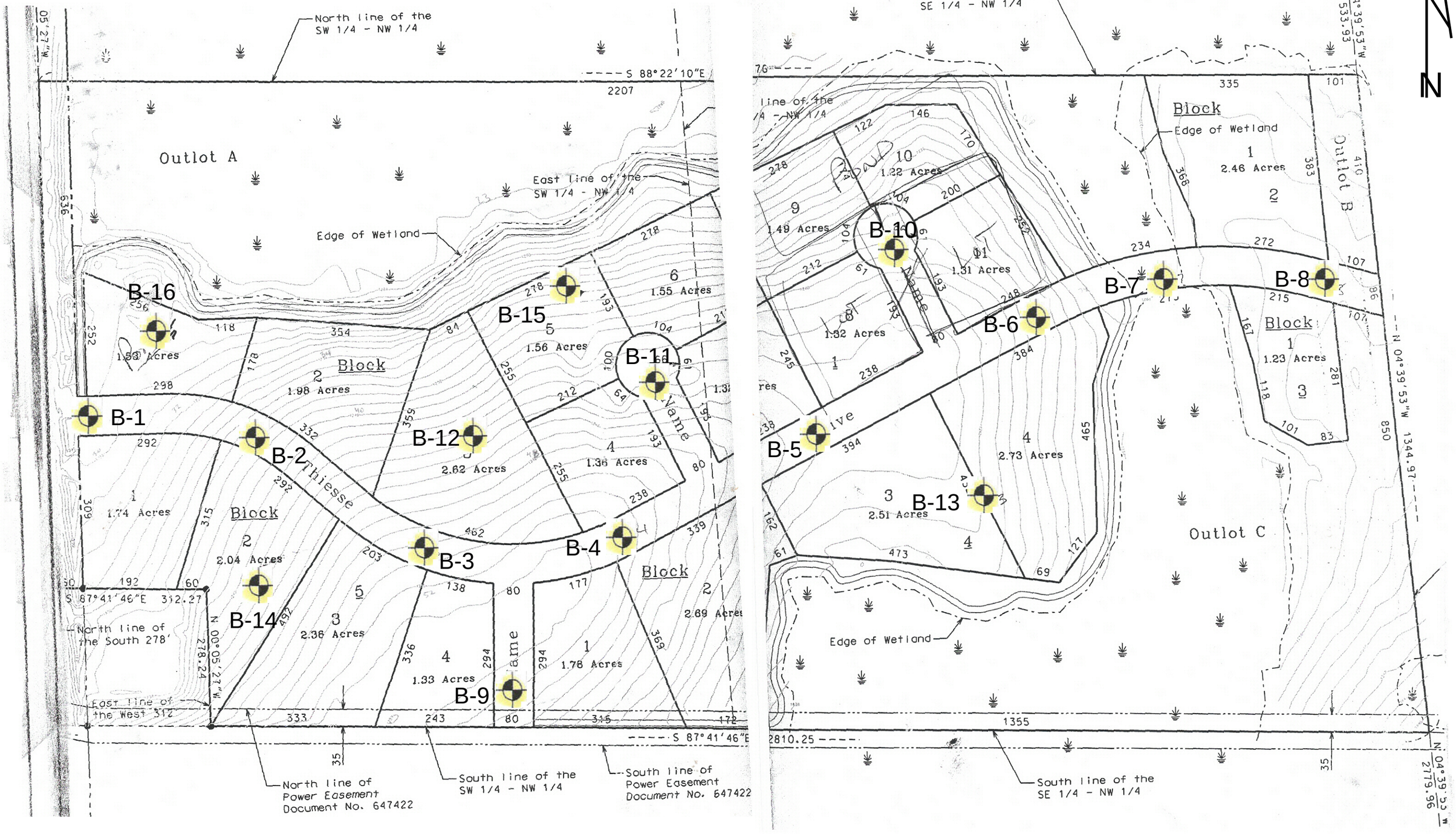
provided by others performing these services in this area. No other warranty is made.

J. Certification

I hereby certify that this report was prepared by me or under my direct supervision and that I am a duly licensed engineer under the laws of the State of Minnesota.

Colby T. Verdegan, PE
Registration number: 018983
Date: April 17, 2007

Boring Location Sketch



LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: S2007.051
Preliminary Geotechnical Exploration
Proposed Industrial Park
Thiesse Drive
Brainerd, Minnesota

BORING: **B-01**

LOCATION:
See attached sketch.

DATE: 04/12/07 SCALE: 1" = 5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1229.0	0.0					
1228.0	1.0	SM	**Slightly Organic SILTY SAND**, trace roots, fine grained, black to dark brown. (Topsoil)			All borings except B-1 and B-12 provided by KLD. Elevations at Borings B-1 and B-12 estimated to the nearest foot from a survey map of the site. These elvevations should be considered very approximate
		SP SM	**POORLY GRADED SAND with SILT**, fine to medium grained, trace gravel, brown, moist, medium dense. (Glacial Till/Glacio-Fluvium)	28		
				35		
1223.0	6.0	SM	**SILTY SAND with GRAVEL**, fine to medium grained, trace cobbles, brown, moist, dense to very dense. (Glacial Till)	46		
				76		
				91		
1213.0	16.0		End of Boring. Boring dry upon completion. Boring backfilled upon completion.			

(SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOB S2007-051 GPJ 04/18/07

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: S2007.051
Preliminary Geotechnical Exploration
Proposed Industrial Park
Thiesse Drive
Brainerd, Minnesota

BORING: **B-02**

LOCATION:
See attached sketch.

DATE: 04/11/07

SCALE: 1" = 5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1238.5	0.0					
1237.5	1.0	SM	**Slightly Organic SILTY SAND**, trace roots, fine grained, black to dark brown. (Topsoil)			
		SP SM	**POORLY GRADED SAND with SILT**, fine to medium grained, trace gravel, brown, moist, very loose to loose.	4		
1233.5	5.0		(Glacial Till/Glacio-Fluvium)			
		SM	**SILTY SAND with GRAVEL**, fine to medium grained, trace cobbles, brown, moist, dense to very dense.	51		
			(Glacial Till)	45		
				75		
				95		
1222.5	16.0					
			End of Boring. Boring dry upon completion. Boring backfilled upon completion.			

(SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOB S2007-051 GPJ 04/18/07

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: S2007.051
Preliminary Geotechnical Exploration
Proposed Industrial Park
Thiesse Drive
Brainerd, Minnesota

BORING: **B-03**

LOCATION:
See attached sketch.

DATE: 04/11/07

SCALE: 1" = 5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1249.4	0.0					
1248.9	0.5	SM	**Slightly Organic SILTY SAND**, trace roots, fine grained, black to dark brown.			
		SM SC	(Topsoil)			
			SILTY SAND to CLAYEY SAND, fine to medium grained, trace gravel, brown, mottled, wet, loose to medium dense.	7		
1244.4	5.0		(Glacial Till/Glacio-Fluvium)			
		SM	**SILTY SAND with GRAVEL**, fine to medium grained, trace cobbles, brown, moist, very dense.	26		
			(Glacial Till)	61		
				82		
				80		
1233.4	16.0					
			End of Boring. Boring dry upon completion. Boring backfilled upon completion.			

(SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOB S2007-051 GPJ 04/18/07

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: S2007.051
Preliminary Geotechnical Exploration
Proposed Industrial Park
Thiesse Drive
Brainerd, Minnesota

BORING: **B-04**

LOCATION:
See attached sketch.

DATE: 04/12/07 SCALE: 1" = 5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1252.7	0.0					
1251.7	1.0	SM	**Slightly Organic SILTY SAND**, trace roots, fine grained, black to dark brown. (Topsoil)			
1249.7	3.0	SM	**SILTY SAND**, fine to medium grained, trace gravel, brown, mottled, wet, medium dense. (Glacial Till/Glacio-Fluvium)	57		
		SM	**SILTY SAND with GRAVEL**, fine to medium grained, trace cobbles, brown, moist, dense to very dense. (Glacial Till)	39		
				41		
				36		
				41		
1232.7	20.0			48		
		SP	**POORLY GRADED SAND**, fine to medium grained, trace gravel, brown, moist, medium dense to dense. (Glacial Outwash)			
				27		
1224.7	28.0					
		SM	**SILTY SAND with GRAVEL**, fine to medium grained, trace cobbles, brown, moist, dense. (Glacial Till)	48		
1219.7	33.0					
			Auger refusal at 33 feet, presumably on cobble or boulder. Boring dry upon completion. Boring backfilled upon completion.			

(SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOB S2007-051 GPJ 04/18/07

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: S2007.051
Preliminary Geotechnical Exploration
Proposed Industrial Park
Thiesse Drive
Brainerd, Minnesota

BORING: **B-05**

LOCATION:
See attached sketch.

DATE: 04/12/07

SCALE: 1" = 5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1245.5	0.0					
1244.5	1.0	SM	**Slightly Organic SILTY SAND**, trace roots, fine grained, black to dark brown. (Topsoil)			
		SP SM	**POORLY GRADED SAND with SILT**, fine to medium grained, trace gravel, brown, slightly mottled, wet, medium dense.	11		
1241.5	4.0		(Glacial Till/Glacio-Fluvium)			
		SM	**SILTY SAND with GRAVEL**, fine to medium grained, trace cobbles, brown, moist, dense to very dense. (Glacial Till)	37		
				43		
				43		
				85		
1229.5	16.0		End of Boring. Boring dry upon completion. Boring backfilled upon completion.			

(SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOB S2007-051 GPJ 04/18/07

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: S2007.051
Preliminary Geotechnical Exploration
Proposed Industrial Park
Thiesse Drive
Brainerd, Minnesota

BORING: **B-06**

LOCATION:
See attached sketch.

DATE: 04/02/07 SCALE: 1" = 5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1243.0	0.0					
1242.0	1.0	SM	**Slightly Organic SILTY SAND**, trace roots, fine grained, black to dark brown. (Topsoil)			
		SP SM	**POORLY GRADED SAND with SILT**, fine to medium grained, trace gravel, brown, moist to wet, medium dense. (Glacial Till/Glacio-Fluvium)	27		
1239.0	4.0	SM SC	**SILTY SAND to CLAYEY SAND**, fine to medium grained, trace gravel, brown, slightly mottled, wet, medium dense. (Glacial Till/Glacio-Fluvium)	27		
1236.5	6.5	SM	**SILTY SAND with GRAVEL**, fine to medium grained, trace cobbles, brown, moist, dense to very dense. (Glacial Till)	37		
				60		
1228.5	14.5		End of Boring. Boring dry upon completion. Boring backfilled upon completion.	*		* 50 = 1" (set)

(SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOB S2007-051 GPJ 04/18/07

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: S2007.051
Preliminary Geotechnical Exploration
Proposed Industrial Park
Thiesse Drive
Brainerd, Minnesota

BORING: **B-07**

LOCATION:
See attached sketch.

DATE: 04/02/07

SCALE: 1" = 5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1232.9	0.0					
1232.4	0.5	SM SP SM	**Slightly Organic SILTY SAND**, trace roots, fine grained, black to dark brown. (Topsoil)			
			POORLY GRADED SAND with SILT, fine to medium grained, brown, moist, loose.	8		
1228.9	4.0		(Glacial Till/Glacio-Fluvium)			
		SM	**SILTY SAND with GRAVEL**, fine to medium grained, trace cobbles, brown, moist, medium dense to very dense.	32		
			(Glacial Till)	30		
				58		
				65		
1216.9	16.0		End of Boring. Boring dry upon completion. Boring backfilled upon completion.			

(SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOB S2007-051 GPJ 04/18/07

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: S2007.051
Preliminary Geotechnical Exploration
Proposed Industrial Park
Thiesse Drive
Brainerd, Minnesota

BORING: **B-08**

LOCATION:
See attached sketch.

DATE: 04/02/07 SCALE: 1" = 5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1235.2	0.0					
1234.7	0.5	SM SP SM	**Slightly Organic SILTY SAND**, trace roots, fine grained, black to dark brown. (Topsoil)			
1231.2	4.0	SM	**POORLY GRADED SAND with SILT**, fine to medium grained, trace gravel, brown, moist to wet, medium dense. (Glacial Till/Glacio-Fluvium)	30		
			SILTY SAND with GRAVEL, fine to medium grained, trace cobbles, brown, moist, medium dense to very dense. (Glacial Till)	56		
				28		
				*		* 60 = 6" (set)
1224.2	11.0		Auger refusal at 11 feet, presumably on cobble or boulder. Boring dry upon completion. Boring backfilled upon completion.			

(SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOB S2007-051 GPJ 04/18/07

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: S2007.051
Preliminary Geotechnical Exploration
Proposed Industrial Park
Thiesse Drive
Brainerd, Minnesota

BORING: **B-09**

LOCATION:
See attached sketch.

DATE: 04/11/07

SCALE: 1" = 5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1253.3	0.0					
1252.8	0.5	SM	**Slightly Organic SILTY SAND**, trace roots, fine grained, black to dark brown. (Topsoil)			
		SM	**SILTY SAND with GRAVEL**, fine to medium grained, trace cobbles, brown, moist, dense to very dense. (Glacial Till)	52		
				44		
				80		
				55		
				103		
1237.3	16.0		End of Boring. Boring dry upon completion. Boring backfilled upon completion.			

(SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOB S2007-051 GPJ 04/18/07

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: S2007.051
Preliminary Geotechnical Exploration
Proposed Industrial Park
Thiesse Drive
Brainerd, Minnesota

BORING: **B-10**

LOCATION:
See attached sketch.

DATE: 04/12/07 SCALE: 1" = 5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1238.5	0.0					
1237.5	1.0	SM	**Slightly Organic SILTY SAND**, trace roots, fine grained, black to dark brown. (Topsoil)			
		SM SC	**SILTY SAND to CLAYEY SAND**, fine to medium grained, trace gravel, contains layers of sand, brown, slightly mottled, wet to 4 feet then moist, medium dense to dense. (Glacial Till/Glacio-Fluvium)	21		
				45		
1232.0	6.5	SP SM	**POORLY GRADED SAND with SILT**, fine to medium grained, brown, wet, medium dense. (Glacial Till/Glacio-Fluvium)	26		
1229.5	9.0	SM	**SILTY SAND with GRAVEL**, fine to medium grained, trace cobbles, brown, moist, very dense. (Glacial Till)	67		
				76		
1222.5	16.0		End of Boring. Boring dry upon completion. Boring backfilled upon completion.			

(SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOB S2007-051 GPJ 04/18/07

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: S2007.051
Preliminary Geotechnical Exploration
Proposed Industrial Park
Thiesse Drive
Brainerd, Minnesota

BORING: **B-11**

LOCATION:
See attached sketch.

DATE: 04/02/07

SCALE: 1" = 5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1242.6	0.0					
1241.6	1.0	SM	**Slightly Organic SILTY SAND**, trace roots, fine grained, black to dark brown. (Topsoil)			
		SM	**SILTY SAND with GRAVEL**, grading to sand with silt, fine to medium grained, trace cobbles, brown, moist, medium dense to very dense. (Glacial Till)	24		
				34		
				32		
				36		
1228.6	14.0					
		SP SM	**POORLY GRADED SAND**, medium grained, contains layers of fine grained silty sand, brown, wet to very wet, medium dense. (Glacial Outwash)	18		
1226.6	16.0		End of Boring. Boring dry upon completion. Boring backfilled upon completion.			

(SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOB S2007-051 GPJ 04/18/07

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: S2007.051
Preliminary Geotechnical Exploration
Proposed Industrial Park
Thiesse Drive
Brainerd, Minnesota

BORING: **B-12**

LOCATION:
See attached sketch.

DATE: 04/12/07

SCALE: 1" = 5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1244.0	0.0					
1243.0	1.0	SM	**Slightly Organic SILTY SAND**, trace roots, fine grained, black to dark brown. (Topsoil)			
		SM	**SILTY SAND with GRAVEL**, fine to medium grained, trace cobbles, brown, moist, medium dense to very dense. (Glacial Till)	25		
				52		
1237.0	7.0		Auger refusal at 7 feet, presumably on cobble or boulder. Boring dry upon completion. Boring backfilled upon completion.			

(SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOB S2007-051 GPJ 04/18/07

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: S2007.051
Preliminary Geotechnical Exploration
Proposed Industrial Park
Thiesse Drive
Brainerd, Minnesota

BORING: **B-13**

LOCATION:
See attached sketch.

DATE: 04/12/07

SCALE: 1" = 5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1241.6	0.0					
1240.6	1.0	SM	**Slightly Organic SILTY SAND**, trace roots, fine grained, black to dark brown. (Topsoil)			
		SM SC	**SILTY SAND to CLAYEY SAND**, fine to medium grained, trace gravel, brown, wet, medium dense. (Glacial Till/Glacio-Fluvium)	27		
1237.6	4.0	SM	**SILTY SAND with GRAVEL**, fine to medium grained, trace cobbles, brown, moist, dense tp very dense. (Glacial Till)	37		
				46		
				78		
1228.6	13.0	SP	**POORLY GRADED SAND**, fine to medium grained, rare gravel, brown, moist, very dense. (Glacial Outwash)	62		
1225.6	16.0		End of Boring. Boring dry upon completion. Boring backfilled upon completion.			

(SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOB S2007-051 GPJ 04/18/07

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: S2007.051
Preliminary Geotechnical Exploration
Proposed Industrial Park
Thiesse Drive
Brainerd, Minnesota

BORING: **B-14**

LOCATION:
See attached sketch.

DATE: 04/12/07 SCALE: 1" = 5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1243.8	0.0					
1242.8	1.0	SM	**Slightly Organic SILTY SAND**, trace roots, fine grained, black to dark brown. (Topsoil)			
1239.8	4.0	SM SC	**SILTY SAND to CLAYEY SAND**, fine to medium grained, trace gravel, brown, slightly mottled, wet, dense. (Glacial Till/Glacio-Fluvium)	41		
1227.8	16.0	SM	**SILTY SAND with GRAVEL**, fine to medium grained, trace cobbles, brown, moist, very dense. (Glacial Till)	54 * 65 77		* 50 = 4" (set)
			End of Boring. Boring dry upon completion. Boring backfilled upon completion.			

(SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOB S2007-051 GPJ 04/18/07

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: S2007.051
Preliminary Geotechnical Exploration
Proposed Industrial Park
Thiesse Drive
Brainerd, Minnesota

BORING: **B-15**

LOCATION:
See attached sketch.

DATE: 04/12/07

SCALE: 1" = 5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1234.8	0.0					
1233.8	1.0	SM	**Slightly Organic SILTY SAND**, trace roots, fine grained, black to dark brown. (Topsoil)			
		SM	**SILTY SAND with GRAVEL**, fine to medium grained, trace cobbles, brown, moist, medium dense to very dense. (Glacial Till)	20		
				42		
				35		
				39		
				57		
1218.8	16.0		End of Boring. Boring dry upon completion. Boring backfilled upon completion.			

(SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOB S2007-051 GPJ 04/18/07

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: S2007.051
Preliminary Geotechnical Exploration
Proposed Industrial Park
Thiesse Drive
Brainerd, Minnesota

BORING: **B-16**

LOCATION:
See attached sketch.

DATE: 04/12/07

SCALE: 1" = 5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1229.0	0.0					
1228.0	1.0	SM	**Slightly Organic SILTY SAND**, trace roots, fine grained, black to dark brown. (Topsoil)			
		SP SM	**POORLY GRADED SAND with SILT**, fine to medium grained, rare gravel, brown, moist, very dense. (Glacial Till/Glacio-Fluvium)	50		
				51		
1222.5	6.5	SM	**SILTY SAND with GRAVEL**, fine to medium grained, trace cobbles, brown, moist, dense. (Glacial Till)	45		
				35		
				39		
1213.0	16.0		End of Boring. Boring dry upon completion. Boring backfilled upon completion.			

(SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOB S2007-051 GPJ 04/18/07